BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Cooper, Priscilla K.	Senior Scientist, Biochemist
eRA COMMONS USER NAME (credential, e.g., agency login) PKCOOPER	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of Rochester, Rochester, NY	B.A. (high distinction)	06/66	Biology
Stanford University, Stanford, CA	Ph.D.	06/71	Biological Sciences
Stanford Univ. School of Medicine, Stanford, CA	postdoctoral training	1971 - 1974	Genetics

A. Personal Statement

I have a career-long interest in the biochemical and molecular basis for cellular processing of damaged DNA and the genetic control of DNA repair processes. The research focus of my laboratory is directed toward understanding the processes that maintain genomic integrity and stability in mammalian cells. I am especially interested in pathway interconnections between nucleotide and base excision repair, transcription, and replication in human cells, particularly with respect to repair of endogenously generated oxidative DNA damage. Most recently, our studies of pathway crosstalk have led us into homologous recombination repair of DNA double-strand breaks. A major goal is to elucidate the mechanistic connections that causally relate genetic defects in repair to cancer and aging. Because of qualitative similarity in the DNA damage induced endogenously and by ionizing radiation, understanding the mechanisms for repair of radiation damage also contributes to understanding the essential role of DNA repair processes in normal development. Thus, another major focus of the lab has been on elucidating the mechanisms for cellular responses to low doses of ionizing radiation. Our research integrates a combination of approaches including protein biochemistry, molecular biology, cell biology, and structural biology, in order to understand the functioning of the critical multi-protein molecular machines that carry out DNA repair. I have been organizer or co-organizer of major scientific conferences in the DNA repair field, have served in a number of scientific advisory and leadership positions, and am a past president of the Environmental Mutagen Society (now Environmental Mutagenesis and Genomics Society). I currently head the LBNL Department of Cell and Molecular Biology, which includes ~20 principal investigators.

B. Positions and Honors

Positions and Employment

1966 – 1971 Graduate Student, Biological Sciences, Stanford University, Laboratory of P.C. Hanawalt
1971 – 1974 Postdoctoral Fellow, Genetics, Stanford School of Medicine, Laboratory of A.T. Ganesan
1974 – 1982 Research Associate, Department of Biological Sciences, Stanford University
1982 – 2000 Staff Scientist, Life Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA
1991 – 2005 Faculty Affiliate, Dept. Radiological Health Sciences, Colorado State Univ., Ft. Collins CO
1995 – 1999 Deputy Head, Dept. of Radiation Biology & DNA Repair, Life Sciences Division, LBNL
1999 – present Department Head (currently Cancer & DNA Damage Responses), Life Sciences, LBNL
2000 – present Senior Scientist, Life Sciences Division, LBNL
2001 – 2003 Acting Division Director, Life Sciences Division, LBNL

Other Experience and Professional Service

1996 – 2000 Member, Chemical Pathology Study Section, NIH Center for Scientific Review
1996 – 1998 Steering Committee, NCI Seattle Project Field Station
1996 – 2000 Associate Editor, *Radiation Research*
1997 Ad hoc member, Oncological Sciences Special Study Section, NIH DRG
1998 Visiting Professor, Universidad de Antioquia, Medellin, Colombia

1999	Scientific Committee, Internatl. Workshop "Radiation Damage to DNA", Chapel Hill NC
1999	Chair, NIH CPA Study Section Workshop on Base Excision Repair, Ventura CA
1999	Reviewer, NIA P01 site visit, University of Southern California
2000	Organizing Committee, Base Excision Repair 2000, Galveston TX
2002	Reviewer, NIEHS P01 site visit, Washington State University
2002 – present	Editorial Board, *DNA Repair* (journal inaugurated January 2002)
2002 – 2003	Scientific Advisory Board on DNA Repair, Cerus Corporation
2003	Program Advisory Committee, Biophysics & Therapy, GSI, Darmstadt Germany
2003	Advisory Committee, UCLA-DOE Institute on Proteomics and Genomics
2003 – 2007	Member, NASA Radiation Discipline Working Group
2004	Ad hoc reviewer, DNA Repair Special Emphasis Panel, NIH CSR
2004	Member, Strategic Review Committee, Life Sciences, Brookhaven National Laboratory
2004	Co-organizer, ASM International Conference on DNA Repair and Mutagenesis, Bermuda
2004 – 2008	Member, Scientific Committee, RISC-RAD Consortium (Euratom)
2005	Local Arrangements Chair, 9th International Conference on Environmental Mutagens
2005; 2007	Vice-Chair and Chair, Gordon Research Conference on Mammalian DNA Repair
2007	Ad hoc reviewer, Molecular Biology P01 Special Emphasis Panel, NIH CSR
2007 – 2011	Executive Board member, Environmental Mutagenesis Society
2008	Program Chair, Environmental Mutagenesis Society Annual Meeting
2008 – 2009	President, Environmental Mutagenesis Society
2009 – 2013	Council member, International Association of Environmental Mutagen Societies
2009	Ad hoc reviewer, Cancer Genetics Special Emphasis Panel, NIH CSR
2009	Co-organizer, ASM International Conference on DNA Repair & Mutagenesis, Whistler, B.C.
2010	Ad hoc reviewer, Radiation Therapeutics and Biology study section, NIH CSR
2010	Organizing Committee, XIth International Workshop on Radiation Damage to DNA, Atlanta
2010 – 2014	Member, Radiation Therapeutics and Biology study section, NIH CSR
2012	Special Emphasis Panel reviewer, NCI P01 applications
2012	External Advisory Board Chair, NIA P01 “DNA repair, mutations, and cellular aging”, Vijg, PI
2012	Expert Reviewer, Euratom FP7-Fission 2012 proposals in Radiation Protection

Honors

1962 – 1966	Bausch and Lomb Science Scholarship, University of Rochester
1966	Janet Howell Clarke Award (outstanding woman science graduate, University of Rochester)
1966	Phi Beta Kappa
1966 – 1970	NSF Predoctoral Fellowship
1971 – 1973	NIH Postdoctoral Fellowship (NCI)
2002	DOE Secretary of Energy Outstanding Mentor Award
2008	Elected President, Environmental Mutagen Society

C. Selected Peer-reviewed Publications (selected from ~50)

1. Querol-Audi J, Yan C, Xu X, Tsutakawa SE, Tsai M-S, Tainer JA, Cooper PK, Nogales E, and Ivanov I. Repair Complexes of FEN1 Endonuclease, DNA, and Rad9-Hus1-Rad1 Are Distinguished from Their PCNA Counterparts by Functionally Important Stability. *Proc Natl Acad Sci USA* **109**, 8528-8533 (2012). PMCID: PMC3365210.
2. Trego KS, Chernikova SB, Davalos AR, Perry JJP, Finger LD, Ng C, Tsai MS, Yannone SM, Tainer JA, Campisi J, and Cooper PK. The DNA Repair Endonuclease XPG Interacts Directly and Functionally with the WRN Helicase Defective in Werner Syndrome. *Cell Cycle* **10,** 1998-2007 (2011). PMCID: PMC3154418.
3. Tsutakawa SE, Classen S, Chapados BR, Arvai A, Finger LD, Guenther G, Tomlinson CG, Thompson P, Sarker AH, Shen B, Cooper PK, Grasby JA, and Tainer JA. Human Flap Endonuclease Structures, DNA Double Base Flipping and a Unified Understanding of the FEN1 Superfamily. *Cell* **145**, 198-211 (2011). PMCID: PMC3086263.
4. Campeau E, Ruhl VE, Rodier F, Smith CL, Rahmberg BL, Fuss JO, Campisi J, Yaswen P, Cooper PK, and Kaufman PD. A Versatile Viral System for Expression and Depletion of Proteins in Mammalian Cells. *PLoS ONE* 4:e6529, 1-18 (2009). PMCID: PMC2717805.
5. Fan L, Fuss JO, Cheng QJ, Arvai AS, Hammel M, Roberts VA, Cooper PK, and Tainer JA. XPD Helicase Structures and Activities: Insights into the Cancer and Aging Phenotypes from XPD Mutations. *Cell* **133**, 789-800 (2008). PMCID: PMC3055247.

6. Pluth JM, Yamazaki V, Cooper BA, Rydberg BE, Kirchgessner CU, and Cooper PK. DNA Double-Strand Break and Chromosomal Rejoining Defects with Misrejoining in Nijmegen Breakage Syndrome Cells. *DNA Repair* **7**, 108-118 (2008).
7. Tsutakawa SE, Hura GL, Frankel KA, Cooper PK, and Tainer JA. Structural analysis of flexible proteins in solution by small angle x-ray scattering combined with crystallography. *J. Struct. Biol.* **158**, 214-223 (2007).
8. Fan L, Arvai A, Cooper PK, Iwai S, Hanaoka F, Tainer JA. Conserved XPB core structure and motifs for DNA unwinding: Implications for pathway selection of transcription or excision repair. *Mol. Cell* **22**, 27-37 (2006).
9. Fuss JO and Cooper PK. DNA repair: Dynamic defenders against cancer and aging. *PLoS Biology* **4**, e203 (2006).
10. Perry JJP, Yannone SM, Holden LG, Hitomi C, Asaithamby A, Han S, Cooper PK, Chen DJ, and Tainer JA. WRN exonuclease structure and molecular mechanism imply an editing role in DNA end processing. *Nature Struct. Mol. Biol.* **13**, 414-422 (2006).
11. Sarker AH, Tsutakawa SE, Kostek S, Ng C, Shin DS, Peris M, Campeau E, Tainer JA, Nogales E, and Cooper PK. Recognition of RNA polymerase II and transcription bubbles by XPG, CSB, and TFIIH: Insights for transcription-coupled repair and Cockayne syndrome. *Mol. Cell* **20**, 187-198 (2005).
12. Kalogeraki VS, Tornaletti S, Cooper PK, and Hanawalt PC. Comparative TFIIS-mediated transcript cleavage by mammalian RNA polymerase II arrested at a lesion in different transcription systems. *DNA Repair* **4**, 1075-1087 (2005).
13. Wang J, Pluth JM, Cooper PK, Cowan MJ, Chen DJ, and Yannone SM. Artemis Deficiency Confers a DNA Double-Strand Break Repair Defect and Artemis Phosphorylation Status is Altered by DNA Damage and Cell Cycle Progression. *DNA Repair* **4**, 556-570 (2005).
14. Wang J-Y, Sarker AH, Cooper PK, and Volkert MR. The single-strand DNA binding activity of human PC4 prevents mutagenesis and killing by oxidative DNA damage. *Mol. Cell. Biol.* **24**, 6084-6093 (2004).
15. Nouspikel T, Lalle P, Leadon SA, Cooper PK, and Clarkson SG. A common mutational pattern in Cockayne syndrome patients from xeroderma pigmentosum group G: Implications for a second XPG function. *Proc. Natl. Acad. Sci. USA* **94**, 3116-3121 (1997).

D. Research Support

Ongoing Research Support

R01 ES019935-10 Cooper, Priscilla K., P.I. 01/09/12 – 10/31/16
NIH/National Institute of Environmental Health Sciences
Novel Interactions of DNA Repair Processes in Replication Fork Maintenance
The goal of this project is to investigate novel replication-associated roles for the multi-functional DNA repair protein XPG through direct, functional interactions with both the WRN helicase and the RAD51 recombinase and to characterize the biological consequences for genome instability of loss of XPG.
Role in project: P.I.

P01 CA092584-11 Tainer, John A., P.I. 09/27/01 - 08/31/16
NIH/National Cancer Institute
Structural Cell Biology of DNA Repair Machines
This integrated multi-institutional Program Project in structural biology of DNA repair (SBDR) addresses the challenge of understanding at the molecular level the pathways controlling genetic integrity through integration of five projects and three cores. SBDR will a) produce biologically relevant DNA repair structures; b) identify fundamental structural principles for repair proteins; and c) provide the structural framework for a unified understanding of the molecular choreography of DNA repair processes.
Role in project: Co-P.I.; Project Leader; ADM Core Director; EMB Core Director

R01 CA112093-03 Tainer, John A, P.I. 04/01/06 – 02/28/16
NIH/National Cancer Institute
Structural Biology of XPB and XPD Helicases
The XPB and XPD helicases are components of the essential transcription and repair factor TFIIH in human cells. This project uses an interdisciplinary approach to define the mechanisms and allosteric interactions of these helicases. The research is designed to test the hypothesis that defined architectures, conformational

states, and molecular interfaces of XPB and XPD provide critical controls for transcription, nucleotide excision repair, and transcription-coupled repair.
Role in project: Co-Investigator

Completed Research Support (selected)

DE AC02 05CH11231 Karpen, Gary E., P.I. 10/01/08 - 09/30/13
Department of Energy
Low Dose Scientific Focus Area: Component 1, Low Dose Response Mechanisms in Complex Human and Mouse Mammary Cell Culture Models
This integrated research project was designed to characterize the molecular and cellular mechanisms that underlie functionally relevant responses of mammary epithelial cells and stromal fibroblasts to low doses and low dose rates of ionizing radiation. It investigated the genetic and epigenetic factors that control differences in such responses between different cell types or among the same cell type from different individuals.
Role in project: Component Leader

2 R01 CA063503-14 Cooper, Priscilla K., P.I. 05/19/94 – 02/29/12
NIH/National Cancer Institute
Mechanisms for Transcription-Coupled Repair in Human Cells
This research program aimed to elucidate the molecular mechanisms both of transcription-coupled repair (TCR) and of the processing of oxidative DNA damage in human cells. The emphasis was on characterization of the multiple critical functions of the highly pleiotropic human DNA repair protein XPG, since evidence suggests that it plays an integrating role in multiple processes for repair of DNA damage. The approach coupled biochemical investigations of XPG interactions with RNAPII and TCR and BER proteins with cellular studies that test the biological significance of these interactions.
Role in project: P.I.

R01 CA80207-05 Cooper, Priscilla K., P.I. 07/01/99 - 04/30/04
National Cancer Institute
Double-Strand Break Misrejoining in Mammalian Cells
The major goal of this project was to elucidate the factors that affect misrejoining of DNA double-strand breaks induced by ionizing radiation in mammalian cells, including the effect of position in the cell cycle.
Role in project: P.I.